

QUALITY CONTROL REPORTS FOR
SEMI DENSE BITUMINOUS CONCRETE



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005



Job No.: CTCE/BBMP/HSN/W.No.07/QB(SDBC)/2014-15

17.06.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	Mr. H.S. Nataraj, Contractor, Bangalore.
NAME OF THE WORK	:	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	17.06.2014

The results of the tests conducted on the bitumen sample for Semi Dense Bituminous Concrete are as follows:



Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	88	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	47	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	286	Min. 220

Note:

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17.06.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. H.S. Nataraj, Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	17.06.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	389	22.07
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	87	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	305	
4	Aggregate Impact value = percent fines $100 * (W_2/W_1) \%$	22.54	21.59	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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17.06.2014

Aggregate Impact Value

IS: 2386 Part IV

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Reference	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	17.06.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	388	22.24
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	88	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	303	
4	Aggregate Impact value = percent fines $100 * (W_2/W_1)\%$	22.56	21.91	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/HSN/W.No.07/SDBC/Shape_T/2014-15

: 17.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: Mr. H.S. Nataraj, Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 17.06.2014



Result : Flakiness Index = **12.58%**

Elongation Index = **13.74%**

Result : Combined Flakiness & Elongation index **26.32%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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: 17.06.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: Mr. H.S. Nataraj, Contractor, Bangalore.
Name of Work	: Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 17.06.2014



Result : Flakiness Index = **11.75%**

Elongation Index = **13.63%**

Result : Combined Flakiness & Elongation index **25.38%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/HSN/W.No.07/SDBC/Stripping/2014-15

19.06.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. H.S. Nataraj, Contractor, Bangalore.
Name of the work	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.06.2014



Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.30	96.70
2	3.5		
3	3.3		



Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/HSN/W.No.07/SDBC/Sp_Wa/2014-15

19.06.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. H.S. Nataraj, Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	19.06.2014



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2028	2030	2029	
2	Weight of basket suspended in water	$W_2 g$	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1273	1275	1274	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2025	2026	2024	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	752	751	750	
6	Weight of oven dried aggregate	$W_4 g$	2011	2010	2008	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.674	2.676	2.677	2.676
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.725	2.735	2.736	2.732
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.70%	0.80%	0.80%	0.76%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%.

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19.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. H.S. Nataraj, Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphalting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
SAMPLE I/D	Roads in Vinayaka Layout 1st Stage Ward No.07
DATE OF TESTING	19.06.2014



BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	5.10	

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19.06.2014

BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. H.S. Nataraj, Contractor, Bangalore.
NAME OF THE WORK	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
SAMPLE I/D	Roads in Vinayaka Layout 1st Stage Ward No.07
DATE OF TESTING	19.06.2014



GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.23	7.63	7.63	92.37	90-100
4.75	242.5	51.05	58.68	41.32	35-51
2.36	55.48	11.68	70.36	29.64	24-39
1.18	36.23	7.63	77.99	22.01	15-30
0.3	45.78	9.64	87.63	12.37	9-19
0.075	32.27	6.79	94.42	5.58	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.23	7.64	7.64	92.36	90-100
4.75	252.4	53.25	60.89	39.11	35-51
2.36	34.85	7.35	68.24	31.76	24-39
1.18	41.27	8.71	76.95	23.05	15-30
0.3	35.69	7.53	84.48	15.52	9-19
0.075	42.13	8.89	93.37	6.63	3-8

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19.06.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. H.S. Nataraj, Contractor, Bangalore.
Name of the Work	Improvements to Roads, Drains and Asphaltting to Roads in Vinayaka Layout 1st Cross, 1st Stage in Ward No.07, Byatarayanapura, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-TND/447/2012-13 Dated: 16.03.2013
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	19.06.2014



Total Weight of Sample: 5300 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	275	5.2	5.19	94.81	90-100	
4.75	2565	48.4	53.58	46.42	35-51	
2.36	842	15.9	69.47	30.53	24-39	
1.18	517	9.8	79.23	20.77	15-30	
0.3	485	9.2	88.38	11.62	9-19	
0.075	328	6.2	94.57	5.43	3-8	

Total Weight of Sample: 5150 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	285	5.5	5.53	94.47	90-100	
4.75	2612	50.7	56.25	43.75	35-51	
2.36	745	14.5	70.72	29.28	24-39	
1.18	516	10.0	80.74	19.26	15-30	
0.3	348	6.8	87.50	12.50	9-19	
0.075	365	7.1	94.58	5.42	3-8	

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